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NOTES AND NEWS.

DR. A. ZIMMERMANN has been advanced to professor "ausserordentlich" in the University of Tübingen.

THE LAST PART of Husnot's *Muscologia Gallica* was announced for issue in September, and will probably appear shortly.

THE EUROPEAN and North American species of Polytrichaceæ are revised by N. C. Kindberg in *Revue Bryologique* 21: 33. 1894.

IN *Garden and Forest* (Sept. 12) Mr. J. N. Rose gives an account of the tree *Ipomœas* of Mexico, describing a new species with illustrations, and also reproducing a capital photograph of a grove of tree *Ipomœas*.

THE ANNOUNCEMENT by Lord Rayleigh and Professor Ramsey of a new gaseous constituent of the atmosphere, made to the British Association at its last meeting, may prove of much importance to vegetable physiologists.

PROFESSOR GEO. F. ATKINSON has published in *Bull. Torr. Bot. Club* (August) a preliminary paper on Some Exoasceæ of the United States. Sixteen species or varieties of *Exoascus* are noted, ten of which are new, and one *Taphrina*.

MR. G. MASSEE is publishing in *Grevillea* revised descriptions of type specimens of fungi in the Kew herbarium, a very useful piece of work since many have been very briefly and imperfectly described. Among them we notice many North American species.

COPIES of the Proceedings of the Madison Botanical Congress have been distributed to a large number of botanists, and may be had by those interested on application to the Secretary, Dr. J. C. Arthur, Lafayette, Indiana. Send four cents in stamps for postage.

THE DIFFICULTIES in the cultivation of black pepper in the West Indies have been successfully overcome in Trinidad, as we learn from a bulletin (no. 23) of the Royal Botanic Gardens. A crop of some 200 lbs. has been harvested and samples have received highly satisfactory valuation.

IN *Erythea* for August Mr. J. Burt Davy begins the very useful publication of transcripts of descriptions of Californian genera and species from rare publications. This first paper contains genera and species described in the St. Petersburg Imperial Botanic Garden Seed Lists from 1834 to 1844.

SCIENCE seems to have been largely absent from the seventh annual meeting of the Association of American Agricultural Colleges and Experiment Stations, judging from the volume of *Proceedings* recently issued. The only reference to botany appears to be two short sets of notes by Prof. B. D. Halsted, on Solandi printing and fungi, given in the appendix.

PARTS 106-108 of *Die natürlichen Pflanzenfamilien* have been distributed, containing the completion of Cactaceæ and the Bignoniaceæ by K. Schumann, the Geissolomaceæ, Penæaceæ, Oliniaceæ, Thymelæaceæ, and Elæagnaceæ by E. Gilg; and the Gesneriaceæ and Columelliaceæ by Karl Fritsch.

PROFESSOR JOHN M. COULTER has been appointed "Professorial lecturer" in Botany at the University of Chicago, in charge of the graduate work. This is the beginning of the development of a department of botany which is to be put upon the same footing as the other departments of the university.

THE SEPTEMBER number of the *Forstlich-naturwissenschaftliche Zeitschrift* contains the first installment of a paper entitled: "A contribution to the history of the development of buds in some deciduous trees," by Dr. Paul Albert, together with several other papers of less botanical interest.—L. S. C.

MR. J. M. BATES in some notes on shrubs of Nebraska (Am. Nat. 28, 803) records finding *Salix tristis* five feet in height, and *Salix cordata* about twenty feet high and eight inches in diameter. He also states that *Oenothera serrulata* is occasionally shrubby, two to six inches of ligneous stem surviving the severest winters.

THE LAST *Erythea* (September) announces the purpose of Professor Greene's mission in Europe. He will visit Kew and the great continental herbaria for a critical study of the types of Pacific Coast plants. It is a fortunate thing that Professor Greene can make this study, as no one is so well fitted to make it of lasting value.

GERMAN INVESTIGATORS find that yeast grown upon different substrata, as gypsum blocks and clay tiles, show decided differences in the formation of the spores. Satisfactory comparison with previous work can only be made, when cultures are carried out under the same conditions as the work with which comparison is to be made.

SUR LES Myxobactériacées, nouvel ordre de Schizomycètes, is the title of Dr. Roland Thaxter's paper, which was printed in this journal for December, 1892, as it appears in the *Revue Mycologique* for July, 1894 (pp. 92-108). It was translated by O. J. Richard and R. Ferry. Only about half the figures of the four plates are reproduced.

MR. A. CURTISS, of Jacksonville, Fla., has just sent out lists of 400 Florida plants of his own collection this year, which constitute the first two fascicles of a new distribution of plants of the southern states. Those who remember the beautiful series of seven fascicles distributed by Mr. Curtiss from 1877-1886 will want to have these also.

THE HERBARIUM of the U. S. Department of Agriculture is being removed from the quarters it has so long occupied in the Agricultural Building into the National Museum. This will consolidate what have heretofore been two herbaria, insure safety from fire, making reference more convenient, and give more room to the much crowded Division of Botany.

THE DIVISION of Vegetable Pathology of the U. S. Department of Agriculture is desirous of including physiology within the scope of

its labors, very justly maintaining that the best work in pathology is based upon an understanding and development of physiology. It is a departure that all friends of botanical science, in both its pure and applied forms, will be glad to see.

M. LEON GUIGNARD, who first demonstrated the existence of "directive spheres" in plants (Compt. rend. 9 March, 1891) has begun the publication of a series of papers "Sur l'origine des sphères directrices" in *Journal de Botanique* (July 16), called out by subsequent publications. Some botanists seem to have confounded with the directive spheres structures of an entirely different nature.

THE REPORT of the director of the office of experiment stations for 1893, just issued, shows that in the fifty-five stations in the United States there are employed thirty-seven botanists, of which seventeen also give attention to other lines of work. Half of the stations employ no botanist, while only three are without a chemist. Altogether there are three chemists employed to one botanist.

IN THE *Journal of Botany* the description of new tropical African plants continues, among them ten Acanthaceæ (one a new genus, *Homilacanthus*) by Spencer Le M. Moore, a new tree *Senecio* by E. G. Baker, and fifteen new Ericaceæ (twelve of which are *Ericas*) by Harry Bolus. In the May number four new British brambles are described, and in August seven new species of *Hieracium*!

THE INTERESTING fresh-water alga, which occurs abundantly in the lakes of Minnesota and adjoining states in the form of floating granules of the size of turnip seeds, at first called *Rivularia fluitans* and afterwards *Gloietrichia Pisum*, has been studied by Paul Richter of Leipzig. He calls it *Gloietrichia echinulata* (Engl. Bot.) P. Richt., and considers it to be a species distinct from the larger form, *Gloietrichia fluitans* (Cohn).

AN ELABORATE PAPER on our present knowledge of the bacteria by Professor L. H. Pammel is printed in the proceedings of the Iowa Academy of Sciences for 1893. It is the presidential address at the last annual meeting; but what is not common in such cases, it is accompanied by references to the literature from which the statements of facts have been taken, there being no less than 148 citations. It is a mine of facts, and a most valuable résumé.

IN *Bulletin de l'Herbier Boissier* for July, M. Micheli describes six new Leguminosæ from Central America, each illustrated by a beautiful plate; Otto Kuntze gives a set of "Nomenclatur-Studien", in which he fully considers certain recent propositions of Pfitzer in Engler's *Jahrbücher*, and also those of the Madison Congress (notably priority of place and the law of homonyms); and A. Kasimir discusses the forms of the oxalate crystals of *Opuntia* and *Pereskia*. In the August number C. DeCandolle describes some new Meliaceæ from South America.

As a résumé of a work published in Danish last year² M. Rosen-

²Groenland's Havalgar. Extr. des Meddelelser om Groenland 3: 763-981. 1893.

vinge publishes, in *Ann. d. Sci. Nat. Bot.* VII. 19: 53 ff. My 1894, *Les algues marines du Groenland*. The work is based on the rich collections of the botanical museum at Copenhagen, which were begun at the end of the eighteenth century by Fabricius, Giesecke, and Wormskiold, and were greatly augmented by Vahl during his eight years sojourn in Greenland, as well as by the abundant contributions of later collectors, including Th. Holm, N. Hartz, and the author. The paper is profusely illustrated by text cuts.

P. KOSSOWITCH has conducted a careful series of experiments in re-examination of the question whether the algæ can fix free nitrogen. He operated with pure cultures of various algæ, obtained in an ingenious way and cultivated in an apparatus of rather complex construction for which the original paper must be consulted.¹ In the entire series of experiments with algæ in pure cultures there was no increase of nitrogen, but when they were mixed with soil bacteria and fungi there was in part a considerable increase of N. Which of the organisms was responsible for this has not yet been determined.

DR. E. L. STURTEVANT has published in *Bull. Torr. Bot. Club* (August) a series of notes on maize, which brings together a very large amount of interesting information. An improved nomenclature for maize is proposed. Taking *Z. tunicata* as a primitive form, five species are derived, *Z. everta* (pop corns), *Z. indurata* (flint corns), *Z. indentata* (dent corns), *Z. amylacea* (soft corns), *Z. saccharata* (sweet corns), and *Z. amyleasaccharata* (starchy-sweet corns). Each of these five furnished three well-defined sub-species, A, B, and C, dependent on the relation between the diameters of the kernel. All the literature concerning corn and its cultivation has evidently been consulted, but the author considers our data as yet too imperfect to hazard an opinion as to the original locality of maize cultivation.

THE UNIVERSITY OF MINNESOTA has purchased Dr. J. H. Sandberg's collections and will conduct his uncompleted exchanges according to the accounts as indicated in his ledgers. From this collection some 22,000 plants are directly transferred to the University herbarium. The University will continue the exchange bureau feature and while the transfer may cause some delay in printing the annual list of plants offered, this list will be forthcoming as soon as possible and in the form of preceding lists. The University of Minnesota has also acquired a collection of 6,500 plants from Mr. G. B. Aiton, a well known and expert collector of western American plants, and some foreign sets of importance. The herbarium is estimated to contain about 140,000 specimens at the present time and is growing rapidly.

RECENT STATION BULLETINS having botanical character are as follows: The Russian thistle is treated by W. M. Hays (Minn. no. 33) from the economic side. Three half-tone illustrations and dissections of the flower give a good idea of the plant. Nevada weeds are discussed by F. H. Hillman (Nev. no. 22). The present bulletin treats of *Hordeum jubatum*, *Franseria Hookeriana*, *Iva axillaris*, *Capsella*

¹Untersuchungen über die Frage, ob die Algen freien Stickstoff fixiren. *Bot. Zeitung* 52: 97-116. 16 My 1894.

Bursa-pastoris, and *Lepidium intermedium*. A sprig and some seeds of each kind of weed are glued to the pages, and with some plates serve as excellent illustrations. An elaborate study of cotton fiber and of its improvement by crossing is given by P. H. Mell (Ala. no. 56). An interesting account of cultivated poplars (Cornell, no. 68) and of native dwarf cherries (Cornell, no. 70) is given by L. H. Bailey, both being unusually well illustrated. Twelve species of poplar and a number of varieties and three species of cherries are described. The latter include a new species, *Prunus Besseyi*, and a hybrid of *P. Besseyi* and *P. Watsoni*. Crown knot, a disease of fruit trees of unknown origin is treated by J. W. Toumey (Ariz. 2, no. 1.

RESEARCHES ON the structure of the Terebinthaceæ by M. Jadin,¹ embracing an examination of 207 species distributed through sixty-seven of the seventy-one genera, show that the stem is always characterized by the secretion canals developed in the phloem and protected by "pericyclic" fibers. This feature is so constant that it seems to be the most important character of the family. The characters furnished by the stem do not suffice to distinguish the genera, though in some cases they may be used to supplement the external morphology. The absence of medullary canals is constant in some genera; their presence is constant in others; and again in some they are either present or absent, for which fact no satisfactory explanation was discovered.

MR. E. BELZUNG calls attention to an important discovery in relation to the rôle of calcium oxalate, viz., its existence in the embryos of papilionaceous Leguminosæ in a state of solution or, more exactly, loose combination with the free acids of the cell sap, e. g., as citrooxalate or oxoxalate of calcium. This is independent of the visible, partly crystalline, partly granular, calcium oxalate, and is prepared to play the rôle of a nutritive reserve. Since oxalate of calcium may exist in considerable quantity exclusively in a dissolved state, the determination of the absence of crystals of this salt is not sufficient ground for predicating its absence in any given species. *Lupinus luteus*, for example, has the oxalate crystals in its cotyledons, while in the same organs of *L. albus* it is all in the dissolved state. But both have crystals in the internal fibrous layer of the hard pericarp. Here however the precipitation of the oxalate is connected with the lignification of the cell walls and is brought about by the resorption of the cell contents, so that it must be looked upon as a product of cellular inanition and not a principle which again participates in normal life.

S. NAWASCHIN contributes to the *Berichte der deutschen botanischen Gesellschaft*,² a preliminary account of his researches on the embryology of the Betulaceæ. He claims to have priority over Miss Margaret Benson's publication regarding the chlazogamic fertilization in these plants (see this journal 19: 299. Jy 1894).

In the present paper he summarizes his conclusions regarding the birches and alders. He finds that the fundament (*Anlage*) of the flower is formed of an axillary shoot whose apex is concealed in the

¹Ann. d. Sci. Nat. Bot. VIII. 18: 151. My 1-894.

²Kurzer Bericht meiner fortgesetzten Studien über die Embryologie der Betulineen. 1. c., 12: 163-169. 31 Ag 1894.

depression between the two carpellary leaves. The two stigmas and the style canal are developed from these carpels later, whereas much the greater part of the ovary is produced by later intercalary growth of the floral axis. The *anlage* of the ovules appear as lateral swellings of the floral axis which grows to form the wall of the ovary; and the alteration produced by the intercalary growth of the axis is such as to make these ovules appear to be upon the margin of the carpels, while in fact they are situated upon an axile placenta which is a columnar prolongation of the axis, and are homologues of leaves. The ovary even at maturity is not closed, the style canal being open; the pollen tube, however, does not pass through it, but penetrates the tissues of the swollen margins of the carpels, of the upper part of the placenta, of the funiculus, and finally of the chalaza, reaching by this route the apex of the embryo sac. Here it broadens irregularly and sends out a number of long outgrowths which not rarely surround the embryo sac from apex to base. The antipodal cells and egg apparatus are as usual, but the two remaining nuclei do not fuse until fertilization proper occurs.

Three stages are marked in this course of development: first, before pollination the ovary is undeveloped, the flower axis has formed the two first leaves (carpels) and its apex forms a yet simple axile placenta; second, at the time of pollination the two carpels have reached their full development, constituting two stigmas and a short style canal, and the axis is forming the next pair of leaves as the ovular *anlage*; third, at the time of fertilization the carpels are long since dried, the ovary has been fully formed and the ovules have just reached their full development.

Nawaschin concluded that there must be an intermediate type between the chlazogamous and porogamous angiosperms and has discovered it in the Ulmaceae. At the time of pollination the ovules are almost ripe; the pollen tube passes through the short style and descends the funiculus half the length of the ovule and then directs itself to the apex of the nucellus which it reaches by penetrating both integuments!

In discussing briefly the evolution of the ovule and fertilization, Nawaschin holds with Agardh that the so-called gymnospermous ovule is to be looked upon as an ovary, the nucellus being an axile placenta containing an ovule limited to the embryo sac (the so-called corpuscula).